



smartbeat

USER GUIDE

Updated August 2012, App Store Version 1.0.0

OVERVIEW

Heart Rate Variability (HRV) is an increasingly popular tool for monitoring athlete wellness and recovery. HRV was initially monitored using ECG traces, however in recent years the use of RR intervals that are measured by selected commercially available heart rate monitors has been validated.

SMARTBEAT is an experimental development project between Fusion Sport and several of our leading SMARTBASE customers. SMARTBEAT is designed to offer athletes and coaches a flexible method for collecting Heart Rate Variability data and performing a standard set of analysis techniques. The application is not designed to provide recommendations to athletes or coaches, as the field of HRV is still lacking established normative data, and considerable expertise is required by the user in order to make decisions based on the outcomes of the data collected.

SMARTBEAT is designed to collect and analyse RR Interval data and perform standard time domain and frequency domain analyses. Functions include:

- Configurable stabilisation, lying and standing phase lengths
- Configurable target breathing frequency
- Audio prompts for phases and breathing frequency
- In-app time domain and frequency domain analyses including SDNN, RMSSD, NN50, pNN50, Mean RR, TotalPower, LF Power, HF Power, LF Normalised Power, HF Normalised Power, Power ratio (LF/HF)
- Graphical representation of RR interval tachogram, HR plot and Power Density Spectrum
- Email raw file function

HARDWARE REQUIREMENTS

SMARTBEAT is compatible with iPhone 3GS, iPhone 4, iPhone 4S, iPod touch (3rd generation), iPod touch (4th generation) and iPad. NOTE – SMARTBEAT requires iOS 5.1 or later, and may suffer performance issues on the iPhone 3GS.

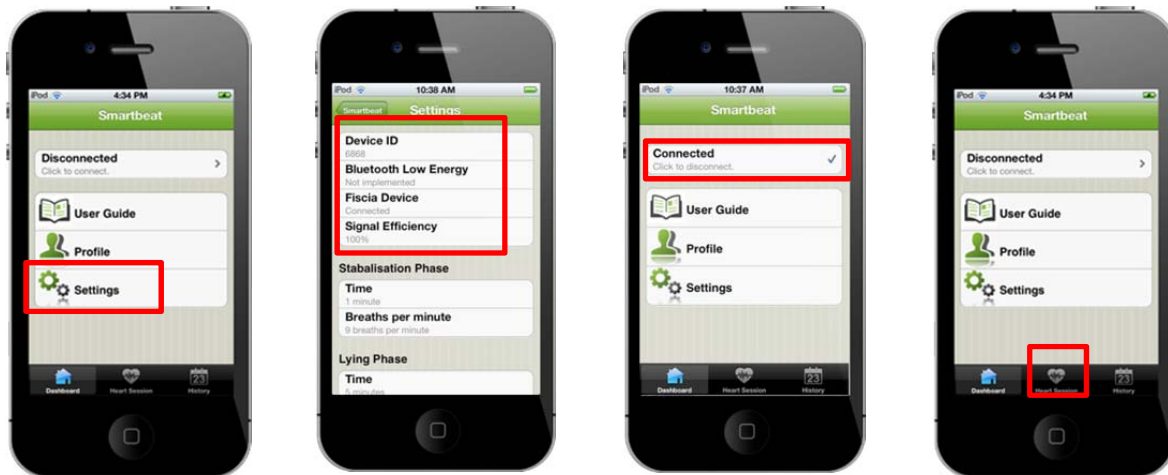
SMARTBEAT has been designed using the Wahoo Fitness API (www.wahoofitness.com) and therefore requires the Wahoo Fitness ANT+ dongle for operation. At the time of the release of Version 1.0.0 SMARTBEAT does not support the Wahoo Blue Bluetooth Low Energy strap version, as RR Interval data is not currently supported by the Wahoo Blue HR straps. Please check for updates as this will be implemented in future releases.

Other ANT+ heart rate straps are compatible with the Wahoo Fitness dongle and may be used. For a list of compatible devices please visit the [Wahoo Fitness website](http://www.wahoofitness.com).

HARDWARE SETUP INSTRUCTIONS

1. Insert the ANT+ dongle into the 30 pin connector at the bottom of your iOS device
2. Launch the SMARTBEAT application and go to the settings area
3. Ensure the Fisica dongle is connected
4. Fit the heart rate strap to the torso. You may need to wet the electrode areas on the strap to achieve a heart rate signal
5. Go back to the main dashboard screen in SMARTBEAT and request a new connection by pressing the "Click to "connect" box

Your device is now ready to use.



SET UP YOUR PROFILE

If you wish to use the email or upload to SMARTBASE functions, you will need to enter your details in the “Profile” tab.

CONFIGURING YOUR SESSION

There are a wide variety of protocols used in the study of HRV. In the “Settings” are, you can configure the following options –

1. Duration of stabilization, lying and standing phases
2. Target breathing frequency for each of these phases

Once configured these settings will be saved for future sessions.

RUNNING A SESSION

IMPORTANT NOTE – It is highly recommended that you enable **Airplane Mode** on your device prior to using SMARTBEAT, so that you are not interrupted during your session by phone calls, emails or other notifications. If iOS diverts attention away from the application, for instance for an incoming call, or the user presses the home button, the application will exit with a warning and all user data from the current session will be discarded. To turn on Airplane Mode, go to the Settings App on your iOS device.

To run a session –

1. Ensure your volume is set to a comfortable level for you to hear the audio prompts during the session
2. Ensure your HR device is connected and working properly. You should see a Heart rate value on the screen
3. Press “Start New Session” to begin. Follow the audio prompts until the session is completed.
4. You will be alerted when the session is finished and can then view your data

NOTE – if you wish to run another session, be sure to close the app first and restart it, as this will free up the iOS memory for the following session.

VIEWING AND EXPORTING RESULTS

Results can be viewed in the “History” tab. When you tap on a session to open it, you will be presented with the following data –

- Time domain and frequency domain analyses including SDNN, RMSSD, NN50, pNN50, Mean RR, TotalPower, LF Power, HF Power, LF Normalised Power, HF Normalised Power, Power ratio (LF/HF)
- Graphical representation of RR interval tachogram, HR plot and Power Density Spectrum

EXPORTING RESULTS VIA EMAIL

Results can be exported via email in CSV format. The CSV file contains the following data 0

- Row 1 – Date
- Row 2 - SDNN, RMSSD, NN50, pNN50, MeanRR
- Row 3 - Total Power, Low Freq. Power, Low Freq. Normalised Power, High Freq. Power, High Freq. Normalised Power, Power Ratio (LF/HF)
- Table 1 - TIME DOMAIN ANALYSIS (4 columns): Beat Number, Total Time, Time Between, and Heart Rate
- Table 2 - FREQ. DOMAIN ANALYSIS (2 columns): Frequency Axis (Hz), PSD Values

To export raw files via email, ensure your email address is set correctly in the settings tab on the dashboard of SMARTBEAT.

EXPORTING RESULTS TO SMARTABASE

SMARTABASE is a comprehensive Athlete Data Management system that your organization must have purchased and provided you with a login to use. Please note it is not included with the SMARTBEAT application. SMARTBEAT can export results directly to your SMARTABASE account. For details of how to configure your SMARTABASE system to receive SMARTBEAT raw files, please consult your SMARTABASE system administrator or Fusion Sport Account Manager.

Once configured, data can be sent to SMARTABASE by-

1. Go to the “History” tab in SMARTBEAT, and open the session you wish to export
2. Scroll down and tap the “Upload to SMARTABASE” button

TROUBLESHOOTING

Problem	Possible Cause	Solution
Heart rate device is not connected	Incompatible hardware	Check that you have a compatible HR strap on the Wahoo Fitness Website
	Device not connected	Repeat steps for connecting HR device
Heart rate is not displayed	Heart rate strap is not properly fitted	Wet the electrode surfaces on the strap and ensure it is fitted properly.
Application crashes on save	Insufficient memory	Ensure your device is running iOS version 5.1 or later
		Exit SMARTBEAT between sessions
		Close other applications on your device which may be using memory

If you require any assistance please contact support@fusionsport.com. For further hardware support issues please contact Wahoo Fitness or visit their [website support area](#).

REFERENCES AND FURTHER INFORMATION ON HRV

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